

IEA-Advanced Motor Fuels ANNUAL REPORT 2024

China



China

Drivers and Policies

In order to achieve China's peak carbon dioxide emissions goal before 2030 and carbon neutrality goal before 2060, China issued a series of related policies to promote both carbon reduction and green development. The automotive industry is an important area for green and low-carbon development, and advanced motor fuels will contribute significantly to reducing pollutant emissions in the transportation sector and promoting carbon neutrality.

Implementation Plan for Establishing a Carbon Footprint Management System

To accelerate the establishment of a carbon footprint management system, foster green and low-carbon supply chains and lifestyles, drive the development of new quality productive forces, and support the achievement of carbon peaking and carbon neutrality goals, the Ministry of Ecology and Environment (MEE), in collaboration with 15 other ministries, released the Implementation Plan for Establishing a Carbon Footprint Management System on May 22, 2024.

By 2027, the carbon footprint management system will be preliminarily established. This includes formulating and releasing a national general standard for product carbon footprint accounting aligned with international norms as well as developing around 100 product-specific carbon footprint accounting standards for key products. By 2030, the system will be further refined, with expanded application scenarios. Approximately 200 product-specific carbon footprint standards will be issued, a comprehensive and internationally influential carbon footprint factor database will be established, and a carbon labeling certification and hierarchical management system will be fully implemented. The carbon footprint accounting rules, factor databases, and certification systems will gradually align with international standards, and China will actively participate in shaping global carbon footprint regulations. This policy will significantly impact the certification and development of low-carbon fuels in China.

Notice on Organizing Technological Breakthroughs and Industrialization Pilots for Green Liquid Fuels (Draft for Public Comment)

On August 21, 2024, China's National Energy Administration (NEA) released the "Notice on Organizing Technological Breakthroughs and Industrialization Pilots for Green Liquid Fuels (Draft for Public Comment)." The term "green liquid fuels" includes biodiesel; sustainable aviation fuel, or SAF (produced from biomass); renewable alcohol ethers (produced from biomass or captured carbon dioxide); and renewable ammonia (produced from green hydrogen). This policy will urge provincial authorities and energy enterprises across China to advance technological research and industrial pilot projects for green liquid fuels.

Guidelines on Vigorously Implementing Renewable Energy Substitution Actions

On October 18, 2024, China's National Development and Reform Commission (NDRC), Ministry of Industry and Information Technology (MIIT), and four other ministries jointly released the "Guidelines on Vigorously Implementing Renewable Energy Substitution Actions." The policy sets two major targets:

1. During the 14th Five-Year Plan period (2021–2025), renewable energy substitution in key sectors will make active progress, with national renewable energy consumption reaching over 1.1 billion tons of standard coal equivalent (SCE) by 2025.
2. During the 15th Five-Year Plan period (2026–2030), a production and lifestyle prioritizing renewable energy will be basically established, with renewable energy consumption exceeding 1.5 billion tons of SCE by 2030, strongly supporting the achievement of China's 2030 carbon peaking target. Additionally, the policy emphasizes promoting the application of sustainable aviation fuels, orderly expanding pilot projects for green and clean liquid fuels in vehicles, and supporting regions with suitable conditions to conduct trials of biodiesel, bio-aviation fuel, biogas, and green hydrogen-ammonia-alcohols in shipping and aviation sectors.

2025 Energy Work Guidelines

On February 27, 2025, China's National Energy Administration (NEA) released the "2025 Energy Work Guidelines," emphasizing the following priorities:

1. Continuously improve the energy technology innovation system. Strengthen standardization in energy digitalization and intelligence, new-type power systems, new energy storage, hydrogen energy, and green liquid fuels, and establish technical committees for emerging fields.
2. Cultivate and expand new energy industries and business models. Explore integrated development models for large-scale wind and solar power bases with related industries, steadily develop renewable hydrogen production and sustainable fuel industries, promote pilot applications of fuel cell vehicles, advance the construction of a national hydrogen energy information platform, prudently explore pilot pipeline hydrogen transmission projects, and improve hydrogen management mechanisms nationwide. Additionally, accelerate technological breakthroughs and industrial pilot projects for green liquid fuels.

Existing National Standards on Alternative Motor Fuels

- GB/T 30366-2024, "Biomass vocabulary," was released on March 15, 2024, and implemented on October 1, 2024.
- GB/T 44723-2024, "Hydrogen internal combustion engines — General technical specification," was released on September 29, 2024, and will be implemented on April 1, 2025.
- GB/T 42416-2023, "M100 methanol fuel for motor vehicles," was released on May 23, 2023, and implemented on September 1, 2023.
- GB/T 42436-2023, "Additives for vehicular M100 methanol fuel," was released on May 23, 2023, and implemented on September 1, 2023.
- GB/T 23510-2009, "Fuel methanol for motor vehicles," was released on April 8, 2009, and implemented on November 1, 2009.
- GB/T 23799-2021, "Methanol gasoline (M85)," for motor vehicles was released on October 11, 2021, and implemented on May 1, 2022.
- GB/T 34548-2017, "The additive of methanol gasoline for vehicles," was released on October 14, 2017, and implemented on May 1, 2018.
- GB/T 31776-2015, "Determination method of methanol content in methanol gasoline for motor vehicles," was released on July 3, 2015, and implemented on October 1, 2015.
- GB/T 26127-2010, "Compressed coalbed methane as vehicle fuel," was released on January 14, 2011, and implemented on June 1, 2011.
- GB/T 26605-2011, "Dimethyl ether for motor vehicle fuel," was released on June 16, 2011, and implemented on November 1, 2011.
- GB 19159-2012, "Automotive liquefied petroleum gases," was released on November 5, 2012, and implemented on April 1, 2013.
- GB 25199-2017, "B5 diesel fuels," was released and implemented on September 7, 2017.
- GB 18351-2017, "Ethanol gasoline for motor vehicles (E10)," was released and implemented on September 7, 2017.
- GB/T 22030-2017, "Blendstocks of ethanol gasoline for motor vehicles," was released and implemented on September 7, 2017.
- GB 35793-2018, "Ethanol gasoline for motor vehicles E85," was released on February 6, 2018, and implemented on September 1, 2018.
- GB 18047-2017, "Compressed natural gas as vehicle fuel," was released on September 7, 2017, and implemented on April 1, 2018.
- GB/T 40510-2021, "Bio-natural gas as vehicle fuel," was released on August 20, 2021, and implemented on March 1, 2022.
- GB/T 34537-2017, "Hydrogen and compressed natural gas (HCNG) blended as vehicle fuel," was released on October 14, 2017, and implemented on May 1, 2018.
- GB/T 37178-2018, "Coal-based synthetic natural gas for vehicle," was released on December 28, 2018, and implemented on July 1, 2019.
- GB/T 37244-2018, "Fuel specification for proton exchange membrane fuel cell vehicles — Hydrogen," was released on December 28, 2018, and implemented on July 1, 2019.
- GB/T 40045-2021, "Fuel specification for hydrogen powered vehicles — Liquid hydrogen (LH₂)," was released on April 30, 2021, and implemented on November 1, 2021.

Advanced Motor Fuels Statistics

In 2024, non-fossil energy accounted for 58.2% of China's total installed power capacity, with renewable energy generation exceeding 3.4 trillion kWh and contributing nearly 40% of total electricity production. The energy system has accelerated its transition to a low-carbon structure, characterized by diversified supply and green consumption. China has achieved nationwide supply of China 6b standard gasoline, and charging infrastructure continued to expand; about 12.4 million charging pillar units have been built around the country.

In 2024, China's auto production and sales reached 31.282 million and 31.436 million units, respectively, maintaining steady growth. New energy vehicle (NEV) production and sales surged to 12.888 million and 12.866 million units, capturing 40.9% of the total automotive market. Battery electric vehicles (BEVs) dominated with 7.72 million units (60% of NEV sales), while plug-in hybrids (PHEVs) reached 5.14 million units (40% of NEV sales). Hydrogen fuel cell vehicle (FCV) sales grew to 7,075 units, primarily in commercial vehicles like trucks and buses. Natural-gas-powered heavy-duty truck sales hit a record 178,200 units, with top provinces being Shanxi (27,381 units), Hebei (27,345 units), Henan (15,187 units), Shandong (significant growth), and Guangdong (rapidly emerging).

Research and Demonstration Focus

Promotion of Methanol Gasoline Vehicles Pilot Project

In 2019, the Ministry of Industry and Information Technology and other relevant ministries jointly issued the "Guiding Opinions on the Application of Methanol Vehicles in Some Areas," supporting areas (such as Shanxi, Shaanxi, Guizhou, and Gansu provinces) with resources and experiences in operating methanol vehicles, to accelerate the application of M100 methanol vehicles.

In 2024, Chinese local governments continued to advance methanol vehicle deployment through region-specific policies and infrastructure expansion. Shanxi Province, a key hub for methanol production, introduced subsidies of up to 50,000 RMB per vehicle to accelerate the replacement of diesel-powered heavy-duty trucks, urban logistics vehicles, and construction machinery with methanol models. The province prioritized methanol refueling infrastructure upgrades, retrofitting 35 gas stations into methanol-compatible facilities along major freight corridors, and established a dedicated methanol heavy-truck logistics platform in Jinzhong City. Guizhou Province, building on its "Guiyang Model" centered on methanol taxis, expanded its fleet to over 21,000 methanol vehicles by 2024, supported by 92 methanol refueling stations, reducing regional gasoline dependence by 9% annually. Inner Mongolia's Hohhot City launched its first methanol vehicle manufacturing base with an annual capacity of 10,000 units, targeting coal transport routes and partnering with energy firms to deploy 4,000 methanol trucks by 2026. Northeastern regions like Shenyang granted methanol vehicles equal road rights to EVs, while Gansu and Shaanxi focused on intercity freight networks, collectively adding 12,000 methanol trucks to replace diesel equivalents in mining and logistics sectors. Nationwide, methanol vehicle reached 52,000 units by Q3 2024, with commercial vehicles (85%) dominating applications, and annual methanol fuel consumption exceeded 3 million tons, displacing 1.8 million tons of gasoline. These efforts were bolstered by Geely's 20 methanol vehicle models, which accumulated over 12 billion kilometers in total mileage, demonstrating the technology's scalability.

Promotion of Hydrogen Fuel Cell Electric Vehicles Pilot Project

In 2024, China's hydrogen fuel cell vehicle (FCV) demonstration programs achieved significant progress through expanded regional collaborations and policy innovations. Building on the 2020 national framework, the five approved city clusters — Beijing-Tianjin-Hebei, Shanghai, Guangdong, Hebei, and Henan — collectively deployed over 15,000 FCVs by mid-2024, with 500+ hydrogen refueling stations operational nationwide, a 23% increase from 2023. Commercial vehicles dominated applications, representing 85% of total FCV sales, particularly in heavy-duty logistics and port operations. For instance, Inner Mongolia deployed 300kW fuel cell systems in coal-hauling trucks, doubling the power output of earlier models.

Local governments introduced tailored incentives to accelerate adoption. Shandong and Guangdong provinces granted FCVs toll-free highway access to boost intercity logistics, while Chengdu launched a “demonstration alliance” model, linking hydrogen system manufacturers, vehicle operators, and refueling stations to deploy 500 FCVs in 2024. Cost reductions further spurred growth: fuel cell system prices dropped to 2,000–2,500 RMB/kW (down 80% from 2020 levels), driven by localized production of core components like membrane electrodes. Infrastructure expanded rapidly, with the Beijing-Tianjin-Hebei cluster adding 40 stations to support heavy trucks with 600-km ranges.

Notable breakthroughs included GAC’s E9 hydrogen-electric sedan, which completed a 10,000-km demonstration run in Tianjin with a hydrogen consumption of 1.4 kg/100 km and 3.5-minute refueling time. Meanwhile, international collaboration advanced through events like the Seoul Hydrogen Industry Summit and the Shanghai FCV Expo, where China led the Global Hydrogen Initiative to harmonize standards. By year-end, China’s FCV operational fleet exceeded 25,000 units, displacing over 170,000 tons of CO₂. Challenges persisted in passenger vehicle adoption and hydrogen pricing, but regional policies — such as Shanxi’s mileage-based subsidies (up to 150,000 RMB annually per truck) — laid groundwork for post-2024 commercialization.

Outlook

China actively develops clean energy, accelerates the introduction of green and low-carbon policies, promotes the “carbon peaking and carbon neutrality” work in an orderly manner, and promotes industry transformation and development toward green and low-carbon solutions.

China will build a carbon footprint management system for automotive products. Meanwhile, the industry will increase investment in green manufacturing, low-carbon product research and development (R&D) and supply, green materials and energy applications, and a circular economy to drive the green and low-carbon development of the whole industry chain. New energy vehicles will accelerate the replacement of fossil fuel vehicles.

Additional Information Sources

- [National Development and Reform Commission \(NDRC\)](#)
- [Ministry of Industry and Information Technology \(MIIT\)](#)
- [Ministry of Ecology and Environment \(MEE\)](#)
- [China Association of Automobile Manufacturers \(CAAM\)](#)
- [CV World](#)